UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,259	03/07/2000	Peter P. Van Bemmel	94.0027	1286

7590 07/15/2004

Geoquest
ATTN J H Bouchard Patent Counsel
5599 San Filipe
Suite 1700
Houston, TX 77056-2722

EXAMINER	
GARCIA OTERO, EDUARDO	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

4

Office Action Summary	Application No.	Applicant(s)	
	09/520,259	VAN BEMMEL, PETER P.	
	Examiner	**Art Unit**	
	Eduardo Garcia-Otero	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/14/2004*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION: First Action after Request for Continued Examination

Introduction

1. Title is: METHOD AND APPARATUS FOR MAPPING UNCERTAINTY AND GENERATING A MAP OR A CUBE BASED ON CONDITIONAL SIMULATION OF RANDOM VARIABLES.
2. First named inventor is: BEMMEL.
3. Claims 1-41 have been submitted, examined, and rejected.
4. This action is in response to Applicant's Request for Continued Examination and Information Disclosure Statement, received 5/14/2004
5. Acknowledgment is made of applicant's claim for priority to provisional application 60/135,904 filed 05/25/1999.

Index of Prior Art

6. **Jones** refers to US Patent 5,838,634.
7. **Matteucci** refers to US Patent 5,884,229.
8. **Tucker** refers to The Computer Science and Engineering Handbook, by Allen B. Tucker, CRC Press, ISBN: 0-8493-2909-4, 1996.
9. **Journel** refers to "Fundamentals of Geostatics in Five Lessons" by Journel, vol 8 AGU, 1989 (mentioned at Specification page 1).
10. **Hogg** refers to Probability and Statistical Inference" by Hogg et al., Third Edition 1988, ISBN 0-02-355810-5, page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
11. **Webber** refers to US Patent 6,081,577.

Definitions

12. **McGraw-Hill Dictionary** refers to The McGraw-Hill Dictionary of Scientific and Technical Terms, Sixth Edition, by McGraw-Hill Companies, Inc., ISBN 0-07-042313-X, 2003.
    - **Gaussian distribution-**"normal distribution".
    - **normal distribution**-"A commonly occurring probability distribution that has the form… [equations] mean… variance. Also known as Gauss' error curve; Gaussian Distribution."

Applicant Remarks

13. INFORMATION DISCLOSURE STATEMENT (IDS). The IDS does not contain a copy of the article by Colin. Thus, the Examiner did not consider said article, and marked the IDS to indicate that said article was not considered. Applicant Remarks page 2 states that Applicant does not have a copy of said article.
14. CLAIM 1, JONES. At Remarks page 17, Applicant asserts that Jones does not disclose "said plurality of <u>scattered data observations distributed among the intersections</u> of said grid on said cross section…". Emphasis in original.
15. However, Jones Abstract states "forming three-dimensional, geologic block models based on field data", and column 1 line 49 "three-dimensional array of individual model units or blocks (also called cells)", and column 2 line 11 "computer grids or meshes", and column 2 line 48 "data to assign values of rock properties of interest to all blocks within the geologic model". In the field of graphics, the two dimensional squares are called "pixels" and the three-dimensional blocks are called "voxels". Pixels and Voxels are clear and useful nomenclature, because they clearly distinguishe between 2-D and 3-D objects.
16. Thus, Jones "field data" discloses the claim 1 "scattered data observations". And Jones "three-dimensional array" and "grids" disclose the claim 1 "intersections". Jones does not explicitly disclose the other limitations.
17. CLAIM 1, MATTEUCCI. At Remarks page 18, Applicant asserts that in claim 1 "each intersection on the grid is, again by definition, a point on (at least a two dimensional plane, not a vertical line passing through the grid". And asserts that in contrast, Matteucci discloses a particular and limited application "that of a cumulative distribution function for a vertical linear seismic trace, not for the cumulative distribution function for a point on a two dimensional horizontal plane, using scattered data observations on that two dimensional plane".
18. At Remarks page 18-20, Applicant further asserts that in Matteucci "is focused on a comparison of seismic traces, which are vertical and, as traces are linear, are one dimensional… Matteucci, FIG. 1", and asserts that in claim 1 "the cumulative distribution functions are taken at each intersection (and each intersection is a point, not a vertical line) of the grid on a plane".

19. However, it appears that the Matteucci FIG 1 is a simplified representation of a concept, and not so limiting as Applicant interprets. The primary tool for geologic data is seismic data. A single explosion (or a series of explosions at multiple locations) are detonated at or near the surface. The shock waves propagate in all directions, not just in a single vertical line as represented by the Matteucci FIG 1. Extracting a three-dimensional model from the seismic data is a challenging undertaking. The seismic trace (data recorded from a single explosion) is inherently a two dimensional (time and amplitude) record or measurement of a very complex interaction (waves propagating underground in 3 dimensions, and reflecting or absorbing due to interfaces and due to bulk properties). Said traces are used to extract a three dimensional model of the geology.
20. Although Jones does not explicitly disclose cumulative distribution functions, the use of cumulative distribution functions is standard statistical analysis, and is disclosed by Matteucci explicitly. One of ordinary skill in the art would probably interpret Jones as implicitly disclosing standard statistical analysis tools, because geologic modeling is a rather advanced art where one of ordinary skill would be well versed in statistical analysis techniques. However, Matteucci is used for explicit disclosure, and Matteucci is in precisely the same field.
21. CLAIM 1, INTERSECTION, MULTIPLE MEANINGS. Applicant repeatedly emphasizes the term "intersection" as a distinguishing feature of claim 1, and asserts that an intersection is a point. The term intersection has multiple meanings in this context. Consider a chessboard, as a simple example, consisting of 64 small squares (8 rows and 8 columns). The first column is called "a", and the first row is called "1". The chessboard intersection designated "a1" represents a square (a two-dimensional object), and not a point. Common automobile map grids use a similar nomenclature system. Similarly, in the context of geologic modeling, an intersection may represent a point, or may represent an area (or pixel), or may represent a volume (or voxel), depending on the context. In other words, the intersection "point" may represent a pixel or voxel with uniform physical properties, such as a black chess square.
22. Thus, the Examiner does not find any meaningful distinction between the terminology of claim 1 and the cited prior art with respect to the term "intersection".

23. CLAIM 1, TUCKER. Applicant asserts (Remarks page 21) that Tucker does not disclose the use of color "assigned to value taken from the cumulative distribution function of an intersection on the grid of the cross section". However, Tucker does disclose the use of color for a "slice" of 3-D model, and does disclose the related claim 1 limitation in the context of Jones and Matteucci. Note that Tucker's use of color coded 3-D slices is widely used in many fields, including CAT scans (computerized aided tomography) and MRI (magnetic resonance imaging) and meteorology. Further, Tucker discloses substantial detail regarding the usefulness of color coding due to preattentive processing, and even presents a "slice" of a 3-D dataset that appears to represent a cloud. Note that Tucker discloses a 2-D grid at the bottom of plate 35.8, and displays the third dimension as a bar at the upper right. Tucker uses a clear method of displaying a 3-D grid, without having the grid interfere with the visualization of the object under study. Tucker is an excellent use of a 2-D representation for a 3-D model.
24. OTHER CLAIMS. Applicant asserts that the 35 USC 103 rejections are improper hindsight. Similar to the above discussion of Matteucci, the primary prior art (Jones) does not explicitly disclose the other limitations. However, for example, Hogg merely discloses standard tables used for applying cumulative distribution functions (Matteucci), and Matteucci's cumulative distribution functions are a standard tool for manipulating experimental date to "assign values of rock properties of interest to all blocks within the geologic model" per Jones column 2 line 48. Specifically, Hogg provides at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356. Modern commercial statistical analysis tools may have these tables stored internally, but Hoggs is (or more accurately was) a college level statistics textbook, and said statistical tables for applying cumulative distribution function analysis are also widely available in mathematics handbooks.
25. Similarly, Journel's publication is titled "Fundamentals of Geostatics in Five Lessons", indicating that these are basic or "fundamental" techniques (such as Kriging) which are "fundamental" in geostatic analysis.

26. SUMMARY. The 35 USC 103 rejections are provided below, with only cosmetic modification. Note the claim interpretation provided below, which states that Applicant's amendments do not appear to change the meaning of the claims.

Claim Interpretation: the word "by"

27. The claim language is interpreted in light of the specification. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

28. In Claim 1, the term **"investigating properties of the plurality of scattered data observations distributed among the intersections of said grid by [obtaining...]"** has been inserted at the beginning of claim 1 limitation (b). Said term does not appear to change the meaning of the previous limitation (b) "obtaining a unique cumulative distribution functions associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid". Rather, the inserted term appears to define itself as equivalent to the previous limitation, due to the use of the word "by".

29. Specifically, **"investigating... by obtaining..."** appears to define **"investigating..." as equivalent to "obtaining..."** in these claims.

30. Claim 15 limitation (b), and claim 25, and claim 30, and claim 36, introduce similar terms including the word "by", which appear merely to introduce and define an equivalent term, and do not appear to change the meaning of the unamended claim.

31. Thus, the 35 USC 103 rejections require only cosmetic changes to explicitly document the amendments, and are not changed in any way with respect to substance.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action: (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

33. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: Determining the scope and contents of the prior art. Ascertaining the differences between the prior art and the claims at issue. Resolving the level of ordinary skill in the pertinent art. Considering objective evidence present in the application indicating obviousness or nonobviousness.

34. Claims 1-41 are rejected under 35 U.S.C. 103(a) as being unpatentable.

35. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.

36. Claim 1 is an independent "method of generating a map… cross section" claim with 4 limitations.

37. (a)-"**gridded cross section**" is disclosed by Jones at Column 1 line 49 "three-dimensional array of individual model units or blocks (also called cells)". Note that a "cross section" is a subset of a three-dimensional array. Also see Jones Column 2 line 10 "structural surfaces or horizons in the form of 2-D computer grids or meshes".

38. Jones does not explicitly disclose the remaining limitations.

39. (b)- **"investigating properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function"** is disclosed by Matteucci at Column 7 line 1 "cumulative distribution function".

40. (c)-"**choosing a value from each of the cumulative distribution function"** is disclosed by Matteucci at Column 7 line 1 "cumulative distribution function".

41. (d)-"**assigning a unique color to said each value"** is disclosed by Tucker at Plate 35.8. Said plate is in color, although the Applicant and the file will be provided only a black and white copy. The bar on the right labeled 0 to 12 displays a range of colors corresponding to different values, and the cutting plane at the center of the plate displays these colors. Each value has a unique color. Also see Tucker page 1520 "Preattentive processing is done for color… very useful if the rapid search for information is desired".

42. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing.

43. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker and Journel.

44. Claim 2 depends from Claim 1, with three additional limitations.

45. Jones does not explicitly disclose the remaining limitations.

46. (b1)-"**Kriging... expected values... standard deviations**" is disclosed by Journal as discussed by Applicant at Specification Page 12 line 13 "The "Kriging" estimate is also known as the 'expected value'", and at Specification Page 12 line 17 "standard deviation".
47. (b2)-"**probability density function**" is disclosed by Journal as discussed by Applicant at Specification Page 12 line 22 "Gaussian". Note that Gaussian distribution means normal distribution, and that these distributions commonly occur in nature.
48. (b3)-"**cumulative distribution function**" is disclosed by Matteucci at Column 7 line 1 "cumulative distribution function".
49. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
50. <u>Claim 3 is rejected</u> under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Hogg.
51. Claim 3 depends from Claim 2, with 1 additional limitation.
52. Jones does not explicitly disclose the remaining limitations.
53. (c1)-"**choosing a probability "(1-Pcu)" from each of the cumulative distribution functions**" is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
54. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard

way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.

55. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Hogg.
56. Claim 4 depends from Claim 2, with 1 additional limitation.
57. Jones does not explicitly disclose the remaining limitations.
58. (c1)-"**choosing a cutoff "Xp" from each of the cumulative distribution functions**" is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
59. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
60. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Hogg.
61. Claim 5 depends from Claim 2, with 1 additional limitation.
62. Jones does not explicitly disclose the remaining limitations.
63. (c1)-"**choosing a lower limit from each of the cumulative distribution functions**" is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
64. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid

searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.

65. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Hogg.
66. Claim 6 depends from Claim 2, with 1 additional limitation.
67. Jones does not explicitly disclose the remaining limitations.
68. (c1)-"**choosing a upper limit from each of the cumulative distribution functions**" is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
69. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
70. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Hogg.
71. Claim 7 depends from Claim 2, with 1 additional limitation.
72. Jones does not explicitly disclose the remaining limitations.
73. (c1)-"**choosing a spread from each of the cumulative distribution functions**" is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
74. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because

cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.

75. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Webber.
76. Claim 8 depends from Claim 2, with 1 additional limitation.
77. Jones does not explicitly disclose the remaining limitations.
78. (c1)-"**affine correction**" is disclosed by Webber at Column 21 line 29 "affine correction".
79. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Weber to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems. Additionally, one of ordinary skill would use affine correction to "counteract" undesired effects according to Webber Column 21 line 16.
80. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journel and Webber.
81. Claim 9 depends from Claim 8, with 1 additional limitation.
82. Jones does not explicitly disclose the remaining limitations.
83. **"assigning said unique color to each said corrected value"** is disclosed by Tucker at Plate 35.8. Said plate is in color, although the Applicant and the file will be provided only a black and white copy. The bar on the right labeled 0 to 12 displays a range of colors corresponding to different values, and the cutting plane at the center of the plate displays these colors. Each

value has a unique color. Also see Tucker page 1520 "Preattentive processing is done for color... very useful if the rapid search for information is desired".

84. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Weber to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems. Additionally, one of ordinary skill would use affine correction to "counteract" undesired effects according to Webber Column 21 line 16.
85. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable
86. Claims 10-14 contain the same additional limitations as Claims 3-7, and therefore are rejected for the same reasons.
87. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
88. Claim 15 is an independent "**program storage device... cross section**" claim, with the same limitations as "method... cross section" Claim 1.
89. Therefore Claim 15 is rejected for the same reasons as Claim 1.
90. Claims 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable
91. Claims 16-24 depend from **"program storage device... cross section"** Claim 15, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.
92. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
93. Claim 25 is an independent "**apparatus... cross section**" claim, with the same limitations as "method... cross section" Claim 1.
94. Therefore Claim 15 is rejected for the same reasons as Claim 1.
95. Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable

96. Claims 26-29 depend from **"apparatus... cross section"** Claim 25, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.

97. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.

98. Claim 30 is an independent "**method... cube**" claim, and is rejected for the same reasons as Claim 1 "method... cross section". Note that the rejection used in Claim 1 applies to three dimensional cubes as well as two dimensional cross sections: is disclosed by Jones at Column 1 line 49 "three-dimensional array of individual model units or blocks (also called cells)". Note that a "cross section" is a subset of a three-dimensional array. Also see Jones Column 2 line 10 "structural surfaces or horizons in the form of 2-D computer grids or meshes".

99. Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable

100. Claims 31-35 depend from **"method... cube"** Claim 30, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.

101. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.

102. Claim 36 is an independent **"program storage device... cube"** with the same limitations as "method... cross section" Claim 1, and therefore is rejected for the same reasons. Again, note that the Jones prior art applies to both cubes and cross sections.

103. Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable

104. Claims 37-41 depend from **"program storage device... cube"** Claim 36, with the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons. Again, note that the Jones prior art applies to both cubes and cross sections.

Conclusion

105. All claims stand rejected against prior art.

Communication

106. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo Garcia-Otero whose telephone number is 703-305-0857. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 7:00 PM. If attempts to reach the Examiner by telephone are unsuccessful, the

Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for this group is 703-872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

* * * *

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER